



# **LDZ Shrinkage Final Estimate Gas Year 2008/9**

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## **1 LDZ Shrinkage Final Estimate for Gas Year 2008/9**

### **1.1 Purpose of Proposal**

The purpose of this paper is to present Wales & West Utilities' Final Estimate in respect of LDZ Shrinkage for the Gas Year 2008/9 as required under Section N of the Uniform Network Code (UNC) Transportation Principal Document (TPD).

Implementation of UNC Modification Proposal 0203V on 1 July 2008 has revised the information that each Transporter is required to publish under UNC TPD Section N. Prior to 1 July 2008 the Transporter had an obligation to set a LDZ Shrinkage Factor for each of its LDZs in order to account for gas used by the Transporter in operation of the System and for gas offtaken but unaccounted for. The revised requirement has replaced the LDZ Shrinkage Factor with an LDZ Shrinkage Quantity. This Final Estimate details both LDZ Shrinkage Factors and LDZ Shrinkage Quantities for ease of transition and comparison.

This Final Estimate remains the same as our Initial Proposals as we have not received any representations from Users.

### **1.2 Summary of Proposal**

The LDZ Shrinkage Quantities and Factors, which are set out in the following table, reflect the losses associated with leakage, theft of gas and gas used in the operation of the system. Details of how these factors have been determined are included in this paper. The structure of the paper follows the format of a UNC Modification Report.

Fugitive emissions of gas have been calculated on an LDZ basis. Theft of gas, and gas used in the operation of the system, has been calculated using previous defined methodology. The calculations used to derive the Shrinkage Quantities and Factors, and a summary of the underlying information, are set out in this proposal.

The Shrinkage Quantity is to be used as the basis for WWU's LDZ Shrinkage gas procurement during the 2008/9 Gas Year.

<b>LDZ</b>	<b>Proposed Shrinkage Quantity (GWh)</b>	<b>Proposed Shrinkage Factor 2008/9 (%)</b>
Wales North	69.3	0.815
Wales South	161.8	0.542
South West	315.0	0.883
<b>Combined Values</b>	<b>546.1</b>	<b>0.737</b>

Note: The Shrinkage Factors shown in the table are expressed as a percentage of forecast LDZ demand.

### **1.3 Component Analysis**

This section of the document presents an analysis of the components of LDZ Shrinkage that make up the Final Estimate for the Gas Year 2008/9 proposal.

#### **1.3.1 Leakage**

Leakage represents the largest component of the LDZ Shrinkage.

For the purpose of analysis, leakage is split into three categories which are:

- Distribution Mains (including service pipes);
- Above Ground Installations (AGIs); and,
- Other losses.

Distribution mains and service leakage is a feature of normal system operation.

AGI leakage includes the routine venting of control equipment.

Other losses include gas lost as a result of interference damage and broken mains. These losses are not continuous; they are caused by specific events.

#### **1.3.2 Distribution Mains (and Services) Leakage**

The leakage of gas from the Distribution mains system (which includes service pipe leakage) is calculated by applying the results of the 2002/3 National Leakage Testing programme to the following network<sup>1</sup> specific information:

- Projected (financial year end 2008/9) records of pipe asset;
- The annual average system pressure in each network<sup>1</sup> for calendar year 2007; and,
- The measured concentration of Monoethylene Glycol (MEG) joint treatment chemical in the gas.

Where applicable (i.e. cast iron mains only) the Pipe Leakage Factors are adjusted to take into account the measured concentration of MEG.

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<sup>1</sup> Network in this context relates to physical interconnected pipe systems, not administrative structure.

The table below shows the Low Pressure leakage on an LDZ basis

<b>LDZ</b>	<b>Low Pressure Leakage (GWh)</b>
Wales North	40.5
Wales South	119.6
South West	247.9
<b>Total</b>	<b>408.0</b>

The table below shows the Medium Pressure leakage on an LDZ basis

<b>LDZ</b>	<b>Medium Pressure Leakage (GWh)</b>
Wales North	3.8
Wales South	10.5
South West	22.8
<b>Total</b>	<b>37.1</b>

### **1.3.3 AGI Emissions**

The figures for leakage from Above Ground Installations have been taken from the findings of the 2003 Above Ground Installation Leakage Test programme.

The table below shows AGI Leakage on an LDZ basis

<b>LDZ</b>	<b>AGI Emissions<sup>2</sup> (GWh)</b>
Wales North	22.3
Wales South	22.3
South West	33.2
<b>Total</b>	<b>77.8</b>

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<sup>2</sup> Includes leakage and routine equipment venting

### 1.3.4 Other Losses

Gas may be lost from LDZ equipment as a result of specific events, namely broken mains and interference damage to plant, in addition to ongoing leakage. These losses are known collectively as “other losses”.

Statistics in respect of the number of broken mains and damages are used in conjunction with calculations on the amount of gas lost through each type of incident to derive the total amount of gas lost as a result of these events (for the purpose of this paper the numbers of events in 2007 have been used for the analysis).

The table below shows the amount of gas lost as a result of other losses for the WWU LDZs.

<b>LDZ</b>	<b>Other Losses (GWh)</b>
Wales North	0.2
Wales South	0.4
South West	0.9
<b>Total</b>	<b>1.5</b>

### 1.3.5 Total Leakage

The table below shows the total amount of predicted leakage for Gas Year 2008/9 on an LDZ basis with the leakage expressed in GWh and as a percentage of forecast LDZ demand.

<b>LDZ</b>	<b>Leakage</b>	
	<b>Quantity (GWh)</b>	<b>Factor (% of forecast LDZ demand )</b>
Wales North	66.6	0.783
Wales South	152.4	0.510
South West	303.9	0.852
<b>Total / Weighted Average</b>	<b>522.9</b>	<b>0.706</b>

## **1.4 Own Use Gas**

Natural gas is a compressible fluid; as a direct result of this property, it experiences a drop in temperature when it undergoes an isenthalpic expansion. When gas has its pressure reduced (at an NTS Offtake or Local Transmission System PRI) the gas on the downstream side of the pressure reduction apparatus is colder than the gas on the upstream side. To avoid the gas leaving a site at below freezing point of water, and causing damage to the downstream pipeline, pre-heating may be applied. Pre-heating is only needed to maintain gas above 0 deg C and if the gas enters the site at a sufficiently high temperature, e.g. during the summer, or if the pressure reduction is small, then pre-heating may not be required.

Pre-heating requires a small proportion of the gas passing through the site to fuel the pre-heating equipment. The amount of fuel required for pre-heating is estimated by applying industry standard thermodynamic equations, LDZ throughput and system pressures together with assumptions about the efficiency of the pre-heating equipment.

Routine venting of gas by control equipment at AGIs could also be said to be Own Use Gas, however for the purpose of this paper it is included within AGI leakage.

WWU have a planned 5 year replacement programme for water bath heaters. On completion of this programme WWU intends to use actual, metered gas consumed for AGI pre-heating rather than a calculated factor. Until completion of this programme, WWU propose to apply the factor of 0.011% to its forecast LDZ demand following studies carried out by Advantica and reported to the Shrinkage Forum.

For the Gas Year 2008/9 the factor for Own Use Gas will be 0.011% of forecast LDZ demand.

## **1.5 Theft of Gas**

UNC Section N 1.3.2 states that LDZ Shrinkage shall include, and WWU is therefore responsible for, gas illegally taken upstream of the customer control valve and downstream where there is no shipper contract with the end-user.

There is a current consensus agreement that unidentified theft is assumed to be 0.2% of forecast LDZ demand, of which 10% is deemed to be Transporters responsibility, resulting in a theft of gas factor of 0.02%.

Therefore for the gas Year 2008/9 the Theft of Gas factor will be set at 0.02%.

## 1.6 LDZ Shrinkage Summary

### 1.6.1 LDZ Shrinkage Quantity Summary

The LDZ Shrinkage Quantities for the Gas Year 2008/9 are presented in the following table.

<b>LDZ</b>	<b>Leakage (GWh)</b>	<b>Own Use Gas (GWh)</b>	<b>Theft of Gas (GWh)</b>	<b>Proposed Shrinkage Quantity 2008/9 (GWh)</b>
Wales North	66.6	1.0	1.7	69.3
Wales South	152.4	3.4	6.0	161.8
South West	303.9	4.0	7.1	315.0
<b>Total</b>	<b>522.9</b>	<b>8.4</b>	<b>14.8</b>	<b>546.1</b>

### 1.6.2 LDZ Shrinkage Factor Summary

The LDZ Shrinkage Quantities for the Gas Year 2008/9 are presented in the following table.

<b>LDZ</b>	<b>Leakage (%)</b>	<b>Own Use Gas (%)</b>	<b>Theft of Gas (%)</b>	<b>Proposed Shrinkage Factor 2008/9 (%)</b>
Wales North	0.783	0.011	0.020	0.814
Wales South	0.510	0.011	0.020	0.541
South West	0.852	0.011	0.020	0.883
<b>Weighted Average</b>	<b>0.706</b>	<b>0.011</b>	<b>0.020</b>	<b>0.737</b>

Note: All factors are expressed as percentages of forecast LDZ demand.

## **1.7 Detailed Analysis**

### **1.7.1 Leakage**

In May 2003, Advantica, on behalf of Transco, completed an extensive programme of Leakage Tests. The results of the leakage testing programmes have been used in conjunction with our mains and other plant records, measurements of MEG concentration and system pressures to derive total leakage by LDZ. The nature of these tests and their findings were described in previous proposals, and will not be included in this paper.

### **1.7.2 Own Use Gas**

The 2008/9 proposals utilise the methodology applied in previous years and incorporating the conclusions of studies carried out by Advantica, whereby Own Use Gas is indicated as being 0.011% of forecast LDZ demand.

### **1.7.3 Theft of Gas**

As a result of previous discussions at The Shrinkage Forum, it was concluded that 0.2% of forecast LDZ demand would be used as the overall level of theft until better information becomes available.

Transco statistics confirm the 90:10 – Shipper: Transporter split in responsibility for theft of gas. We believe that it is appropriate that WWU should assume responsibility for Theft of Gas equal to 0.02% of forecast LDZ demand.

### ***1.8 Extent to which the Proposal would better facilitate the relevant objectives***

This paper provides an accurate estimate of LDZ Shrinkage for the Gas Year 2008/9. Gas usage and loss in transportation within the LDZs will be reflective of actual conditions. This in turn facilitates the achievement of efficient and economic operation of the system through effective targeting of costs.

It will also lead to accurate targeting of costs to Users through the Reconciliation by Difference process and this is consistent with securing effective competition.

### ***1.9 The implications for Wales & West Utilities of implementing the Proposal including:***

#### **a) Implications for operation of the System:**

We are not aware of any such implications that would result from implementing this proposal.

#### **b) Development and capital cost and operating cost implications:**

The proposed LDZ Shrinkage Quantities (which have been prepared without Pressure and Temperature correction) lead to a fair allocation of operating costs between LDZ systems.

#### **c) Extent to which it is appropriate for Wales & West Utilities to recover the costs, and proposal for the most appropriate way for Wales & West Utilities to recover the costs:**

It is appropriate for each LDZ to incur a share of the overall Shrinkage cost dependant upon the actual shrinkage in that LDZ.

#### **d) Analysis of the consequences (if any) this proposal would have on price regulation**

We are not aware of any such implications that would result from implementing this proposal.

### ***1.10 The implications of implementing the Proposal for Users***

This proposal improves the equitability and accuracy of cost targeting across all Users.

### ***1.11 Analysis of any advantages or disadvantages on implementation of the Proposal***

- **Advantages:** Good representation of the actual system usage and losses leading to improved cost targeting.
- **Disadvantages:** WWU are not aware of any disadvantages.

***1.12 Summary of the representations (to the extent that the import of those representations are not reflected elsewhere in the Proposal)***

This paper outlines our LDZ Shrinkage Final Estimate; this remains unchanged from our Initial Proposals as we have not received and representations from Users.

***1.13 Programme of works required as a consequence of implementing the Proposal***

The only required modification is to the LDZ Shrinkage Quantities that will be entered into the UK Link systems.

***1.14 Proposed implementation timetable (including timetable for any necessary information system changes)***

Users now have until 15<sup>th</sup> September 2008 to request that Ofgem issues a Condition 7(4) disapproval of this proposal. This provision is in the UNC Section N 3.1.8.

If no disapproval notice is issued beforehand, it will be our intention to implement revised LDZ Shrinkage Quantities from 06:00 hrs on 1<sup>st</sup> October 2008.

***1.15 Recommendation concerning the implementation of the Proposal***

We recommend the proposed LDZ Shrinkage Quantities be implemented with effect from 06:00 hrs on 1<sup>st</sup> October 2008.

***1.16 Wales & West Utilities Proposal***

This report contains our proposal for LDZ Shrinkage for the Gas Year 2008/9

## **Appendix 1**

### **LP Pipe and Service Leakage Analysis 2006 to 2007**

This section of the document provides a comparison of the assessed levels of LP pipe and service leakage by LDZ.

Details of leakage quantities in tonnes and energy quantities, annual average system pressures (ASP) and Monoethylene Glycol (MEG) levels are presented for 2006 with 2007 for comparison purposes. The levels quoted are only those attributable to low pressure mains and service leakage.

We have supplied information relating to the average pressure that is experienced by networks that contain metallic pipes and which excludes the all PE networks that often operate at higher pressures but which have very low leakage as a result of their superior performance. This will allow Users to compare the effective operating pressures of the different LDZs.

**Table 1 Wales North LDZ**

	<b>2006</b>	<b>2007</b>
Leakage (GWh)	42.1	40.5
Annual Average System Pressure	42.42mbarg	41.79
ASP (All-PE systems excluded)	42.29mbarg	41.13
MEG Saturation Level	0%	0%

**Table 2 Wales South LDZ**

	<b>2006</b>	<b>2007</b>
Leakage (GWh)	137.2	119.6
Annual Average System Pressure	38.3 mbarg	33.74
ASP (All-PE systems excluded)	38.10mbarg	34.27
MEG Saturation Level	0%	0%

**Table 3 South West LDZ**

	<b>2006</b>	<b>2007</b>
Leakage (GWh)	259.8	247.9
Annual Average System Pressure	34.33 mbarg	33.65
ASP (All-PE systems excluded)	33.97 mbarg	32.90
MEG Saturation Level	4.48%	0%

## **Appendix 2**

### **Flow-weighted Average Calorific Values (CVs) for each LDZ for 2006 & 2007**

The daily flow weighted average calorific Values for each LDZ, determined in accordance with the gas (Calculation of Thermal Energy) Regulations, have been used to determine flow-weighted averages for 2007. These values have been applied to convert leakage estimates in volume terms to energy quantities for each LDZ. The values are presented in the table below with 2006 for comparison purposes.

<b>LDZ</b>	<b>Average Calorific values (MJ/m<sup>3</sup>)</b>	
	<b>2006</b>	<b>2007</b>
Wales North	39.65	39.40
Wales South	39.26	39.20
South West	39.33	39.20